means for measuring at least one quantity related to the subject's displacement from a standing equilibrium position;

a fixed support surface on which the subject's first leg rests;

a movable support surface, on which the subject's second leg rests, the movable support surface being rotatable about a horizontal axis;

actuator means for rotating the movable support surface;

control means for receiving the quantity related to the subject's displacement from a standing equilibrium position and for controlling the actuator means so that the actuator means causes the movable support surface to rotate on a continuous basis in functional relation to the measured quantity, so that the movable support surface has a sway-reference gain greater than zero; and

means for measuring the subject's ability to maintain the standing equilibrium position.

2. A device for determining the extent of a subject's independent ability to maintain, by coordination of muscular responses to sensory information, a position in equilibrium, such device comprising;

perturbing means for disturbing the subject's position in equilibrium, wherein the perturbing means include a handle for being grasped by the subject;

sensing means for sensing the degree of contractile activity in a plurality of muscles as the subject attempts to restore equilibrium;

analyzing means for determining at least one of the order or distributional relationship of such contractile activity.

3. A device for determining the extent of a subject's independent ability to maintain, by coordination of muscular responses to sensory information, a position in equilibrium, such device comprising;

perturbing means for disturbing the subject's position in equilibrium, wherein the perturbing means include a handle for being grasped by the subject and movable along a horizontal axis;

sensing means for sensing the degree of contractile activity in a plurality of muscles as the subject attempts to restore equilibrium;

analyzing means for determining at least one of the order or distributional relationship of such contractile activity.

4. A device for determining the extent of a subject's independent ability to maintain, by coordination of muscular responses to sensory information, a position in equilibrium, such device comprising;

perturbing means for disturbing the subject's position in equilibrium, wherein the perturbing means includes a support means, independently movable linearly along a horizontal axis, for supporting a subject in equilibrium;

sensing means for sensing the degree of contractile activity in a plurality of muscles as the subject attempts to restore equilibrium;

analyzing means for determining at least one of the order or distributional relationship of such contractile activity.

5. A device according to claim 3, wherein the analyzing means includes computing means for computing a quantity over time related to the levels of contractile activity in selected muscles.

6. A device according to claim 4, wherein the analyzing means includes computing means for computing a quantity over time related to the levels of contractile activity in selected muscles.

7. A device according to claim 2, wherein the analyzing means includes computing means for computing a quantity over time related to the levels of contractile activity in selected muscles.

8. A method for assessing a subject's ability to utilize support surface inputs from one of the subject's first and second supporting legs, such method comprising:

A. providing two support surfaces, and standing the subject on the support surface, so that each of the two support surfaces has only one leg resting thereon;

B. measuring at least one quantity related to the subject's displacement from the standing equilibrium position;

C. fixing the support surface on which the first leg rests, so that it does not move;

D. rotating about a horizontal axis on a continuous basis the other support surface, on which the subject's second leg rests, in functional relation to the measured quantity, so that the support surface that is moving has a sway-reference gain greater than zero; and

E. measuring the subject's ability to maintain the standing equilibrium position.

9. A device for assessing a subject's ability to utilize support surface inputs from one of the subject's first and second supporting legs, such method comprising:

a fixed support surface on which the subject's first leg rests;

a movable support surface, on which the subject's second leg rests, the movable support surface being rotatable about a horizontal axis;

a compliant element for restraining the rotational motion, so that the movable support surface moves on a continuous basis in functional relation to the subject's displacement from a standing equilibrium position, so that the movable support surface has a sway-reference gain greater than zero; and

means for measuring the subject's ability to maintain the standing equilibrium position.

* * * * *

10. A method for testing whether a subject's ability to maintain position in equilibrium in a selected plane of motion is grossly abnormal with respect to both of two criteria, where the first criterion (termed "direct sensory control criterion") is the ability to maintain equilibrium position while support surface inputs and visual inputs related to motion in the selected plane are simultaneously disrupted, and the second criterion (termed "adaptive sensory control criterion") is the ability to maintain equilibrium position while surface inputs related to motion in the selected plane are disrupted and the subject is simultaneously exposed to incorrect visual inputs, and such method comprising:

(1) Performing Test Procedure Y as follows:

(A) placing the subject in a standing position of equilibrium on a support surface which permits rotation of the subject's feet as the subject sways from the equilibrium position, thereby reducing changes in angle between the orientation of the subject and the inclination of the support surface;

(B) having the subject stand with eyes closed or blindfolded;

(C) determining whether or not the subject independently maintains the position in equilibrium;

(2) Performing Test Procedure Z as follows:

(A) placing the subject in a standing position of equilibrium on a support surface which permits rotation of the subject's feet as the subject sways from the equilibrium position, thereby reducing changes in angle between the orientation of the subject and the inclination of the support surface;

(B) substantially surrounding the subject's field of view with a second surface which moves as the subject sways from the equilibrium position (hereinafter the "visual surround"), thereby reducing changes in angle between the orientation of the subject and the orientation of the visual surround; and

(C) determining whether or not the subject independently maintains the position in equilibrium.

11. A method for testing whether a subject's ability to maintain a position in equilibrium by appropriately organizing sensory orientation inputs in a selected plane of motion according to two criteria is normal with respect to the first criterion but grossly abnormal with respect to the second criterion, where the first criterion (termed "direct sensory control criterion") is the ability to maintain equilibrium position while support surface input and visual inputs are simultaneously disrupted, and the second criterion (termed "adaptive sensory control criterion") is the ability to maintain equilibrium position while surface inputs are disrupted and the subject is simultaneously exposed to incorrect visual inputs, such method comprising:

(1) Performing Test procedure X as follows:

(A) placing the subject in a standing position of equilibrium on a support surface which permits rotation of the subject's feet as the subject sways from the equilibrium position, thereby reducing changes in angle between the orientation of the subject and the inclination of the support surface;

(B) determining whether or not the subject independently maintains the position in equilibrium;

(2) Performing Test Procedure Y as follows:

(A) placing the subject in a standing position of equilibrium on a support surface which permits rotation of the subject's feet as the subject sways from the equilibrium position, thereby reducing changes in angle between the orientation of the subject and the inclination of the support surface;

(B) having the subject stand with eyes closed or blindfolded;

(C) determining whether or not the subject independently maintains the position in equilibrium;

(3) Performing Test Procedure Z as follows:

(A) placing the subject in a standing position of equilibrium on a support surface which permits rotation of the subject's feet as the subject sways from the equilibrium position, thereby reducing changes in angle between the orientation of the subject and the inclination of the support surface;

(B) substantially surrounding the subject's field of view with a second surface which moves as the subject sways from the equilibrium position (hereinafter the "visual surround"), thereby reducing changes in angle between the orientation of the subject and the orientation of the visual surround; and

(C) determining whether or not the subject independently maintains the position in equilibrium.

12. A method according to claim 11, further including the steps of

measuring changes in the subject's orientation angle;

determining, if the subject maintains the position in equilibrium over a first specified time interval while the subject stands on the support surface with eyes closed or blindfolded, an index of stability for this Test Procedure Y, such index termed the "index of blind stability," related to the average amplitude of change in the measured subject's orientation angle during the first specified interval of time; and

determining, if the subject maintains the position in equilibrium over a second specified time interval while the subject stands on the support surface with the subject's field of view surrounded with the second surface, an index of stability for this Test Procedure Z, such index termed the "index of visually disinformed stability," related to the average

amplitude of change in the measured subject's orientation angle during the second specified interval of time.

13. A method for testing a subject's ability to maintain position in equilibrium, such method comprising:

placing the subject in a standing position of equilibrium on a support surface which permits rotation of the subject's feet as the subject sways from the equilibrium position;

having the subject stand with eyes closed or blindfolded;

determining whether or not the subject independently maintains the position in equilibrium while the subject stands on the support surface with eyes closed or blindfolded;

substantially surrounding the subject's field of view with a second surface which moves as the subject sways from the equilibrium position; and

determining whether or not the subject independently maintains the position in equilibrium while the subject stands on the support surface with the subject's field of view surrounded with the second surface.

14. A method for testing a subject's ability to maintain a position in equilibrium, such method comprising:

placing the subject in a standing position of equilibrium on a support surface which permits rotation of the subject's feet as the subject sways from the equilibrium position;

determining whether or not the subject independently maintains the position in equilibrium while the subject stands on the support surface;

having the subject stand with eyes closed or blindfolded;

determining whether or not the subject independently maintains the position in equilibrium while the subject stands on the support surface with eyes closed or blindfolded

substantially surrounding the subject's field of view with a second surface which moves as the subject sways from the equilibrium position; and

determining whether or not the subject independently maintains the position in equilibrium while the subject stands on the support surface with the subject's field of view surrounded with the second surface.

add a1

~~add c2~~

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